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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/633,614	08/05/2003	Motohide Takeichi	106973.01	5380
25944	7590	09/28/2005	EXAMINER	
OLIFF & BERRIDGE, PLC . P.O. BOX 19928 ALEXANDRIA, VA 22320			CHANG, VICTOR S	
			ART UNIT	PAPER NUMBER
			1771	
DATE MAILED: 09/28/2005				

Please find below and/or attached an Office communication concerning this application or proceeding.

**Office Action Summary**

Application No.

10/633,614

Applicant(s)

TAKEICHI ET AL.

Examiner

Victor S. Chang

Art Unit

1771

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --  
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

- 1) ☒ Responsive to communication(s) filed on 17 August 2005.  
2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.  
3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

- 4) ☒ Claim(s) 1 and 4-7 is/are pending in the application.  
4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.  
5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.  
6) ☒ Claim(s) 1 and 4-7 is/are rejected.  
7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.  
8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

- 9) ☐ The specification is objected to by the Examiner.  
10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).  
11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. § 119**

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).  
a) ☐ All b) ☐ Some \* c) ☐ None of:  
1. ☐ Certified copies of the priority documents have been received.  
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.  
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

**Attachment(s)**

- 1) ☒ Notice of References Cited (PTO-892)  
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)  
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08)  
Paper No(s)/Mail Date \_\_\_\_\_  
4) ☐ Interview Summary (PTO-413)  
Paper No(s)/Mail Date. \_\_\_\_\_  
5) ☐ Notice of Informal Patent Application (PTO-152)  
6) ☐ Other: \_\_\_\_\_

## **DETAILED ACTION**

### ***Introduction***

1. The Examiner has carefully considered Applicants' amendments and remarks filed on 8/17/2005. Applicants' amendments to the specification, claims 1, 5 and 6, cancellation of claims 2 and 3, and new claim 7 have been entered.
2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.
3. Rejections not maintained are withdrawn. In particular, the Terminal Disclaimer filed 8/17/2005 disclaims the terminal part of U.S. Pat. Nos. 6514433, 6566422, 6451875, 6673858 and 6426021 has been approved, and the obviousness double patenting rejections are withdrawn. Further, while Applicants' amendment overcomes Shiobara et al. (US 6083774) alone, an additional search is required, and it yielded a new reference Shiobara et al. (US 6001901). The combined teachings of the references are found to render obvious the instant claimed invention. Applicant's comments regarding the prior art are moot in view of the new grounds of rejection.

### ***Rejections Based on Prior Art***

4. Claims 1 and 4-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over Shiobara et al. (US 6083774) in view of Shiobara et al. (US 6001901), generally as set forth in section 14 of Office action dated 4/22/2005, together with the following additional reasoning and response to argument.

First, for the purpose of clarification, the Examiner repeats the relied upon prior art as follows: Shiobara '774 is directed to mounting a semiconductor chip on a circuit substrate. The space between the semiconductor chip and the circuit substrate is sealed with an encapsulating resin composition in molten state. The composition contains (a) an epoxy resin, (b) a curing agent, and (c) an inorganic filler (i.e., a thermosetting resin with an inorganic filler) (Abstract). The inorganic filler has a mean particle size from 1 to 15  $\mu\text{m}$ , more desirably 2 to 10  $\mu\text{m}$ ; the maximum particle size is up to 24  $\mu\text{m}$ , more desirably up to 20  $\mu\text{m}$ , most desirably up to 10  $\mu\text{m}$ ; and the specific surface area (BET adsorption method) is 3.5 to 6.0  $\text{m}^2/\text{g}$ . In one example of using fused silica or alumina as the inorganic filler, the amount of fused silica or alumina used is preferably 100 to 550 parts, more preferably 200 to 450 parts by weight per 100 parts by weight of the epoxy resin and the curing agent combined. Less than 100 parts of fused silica or alumina would be too small to fully reduce the coefficient of expansion whereas compositions containing more than 550 parts of fused silica or alumina would become too viscous to mold.

Second, it is noted that claim 1 has been amended to a narrower range of specific surface area ( $11 < S \leq 17$ ) of the inorganic particles, and also incorporates the dimensional relationship from cancelled claim 2.

With respect to the narrower range of specific surface area, the Examiner notes that clearly Shiobara '774 discloses a mean specific surface area (BET adsorption method) for inorganic filler which has a mean particle size from 1 to 15  $\mu\text{m}$ , as set forth above, and lacks a teaching as to the specific surface areas of corresponding particle

sizes. However, it is noted that Shiobara '901 is directed to resin compositions comprising an epoxy resin, a curing agent, and an inorganic filler, and the inorganic filler (abstract), and are used as encapsulants (or molding compounds for semiconductor devices) for advanced thin packages (column 1, lines 7-9). The preferred inorganic filler has a mean particle size of 4 to 30  $\mu\text{m}$ , more preferably 10 to 25  $\mu\text{m}$ , such a particle size distribution that fine particles having a particle size of at most 3  $\mu\text{m}$ , account for 10 to 40% by weight of the filler and the maximum particle size is less than 100  $\mu\text{m}$ , more preferably less than 74  $\mu\text{m}$ , and a specific surface area of 1.5 to 6  $\text{m}^2/\text{g}$  (column 4, line 62 to column 5, line 2). Further, Shiobara '901 expressly teaches that a fraction of the filler ranging from a mean particle size of 3  $\mu\text{m}$  to ultrafine silica plays a very important role in achieving the closest packing of the filler, imparting thixotropy to the composition to reduce its viscosity, and controlling the flow of the composition. The fraction of the filler ranging downward from a mean particle size of 3  $\mu\text{m}$  is desirably obtained by properly mixing ultrafine silica having a mean particle size of less than 0.05  $\mu\text{m}$ . The microparticulate filler having a mean particle size of 0.05 to 0.3  $\mu\text{m}$  is desirably a spherical one having a specific surface area of 10 to 40  $\text{m}^2/\text{g}$ . The filler having a mean particle size of 0.5 to 3  $\mu\text{m}$  is also desirably a spherical one having a specific surface area of 5 to 40  $\text{m}^2/\text{g}$  (column 5, lines 21-38). As such, in the absence of unexpected results, it would have been obvious to one of ordinary skill in the art to incorporate a fraction of inorganic filler which has a specific surface area of 5 to 40  $\text{m}^2/\text{g}$ , as taught by Shiobara '901, in the encapsulating resin composition of Shiobara '774, while maintaining the mean specific surface area of 3.5 to 6.0  $\text{m}^2/\text{g}$ , motivated by the desire to

achieving the closest packing of the filler, imparting thixotropy to the composition to reduce its viscosity, and controlling the flow of the composition.

Referring to the amended narrower range of specific surface area, Applicants' argument "Shiobara teaches inorganic filler materials having a smaller specific surface areas, from 3.5 m<sup>2</sup>/g to 6.0 m<sup>2</sup>/g, or auxiliary silica filler materials have a much larger specific surface areas, from 50 m<sup>2</sup>/g to 300 m<sup>2</sup>/g ... Thus, Shiobara does not disclose, nor does it suggest, the inorganic particles of claim 1" (Remarks, page 7) has been carefully considered, but is not persuasive. The Examiner repeats that the combined teachings of Shiobara '774 and Shiobara '901 renders the instant invention obvious. Specifically, Shiobara '901 teaches that it is desirable to incorporate a fraction of inorganic filler which has a specific surface area of 5 to 40 m<sup>2</sup>/g in the encapsulating resin composition, as set forth above. Applicants' argument lacks merit in view of the new reference Shiobara '901.

Finally, it should be noted that new claim 7 rejected for the same reasoning as set forth above.

### ***Conclusion***

5. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

6. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Victor S. Chang whose telephone number is 571-272-1474. The examiner can normally be reached on 8:30 - 5:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Terrel H. Morris can be reached on 571-272-1478. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.


Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only.

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For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

*VSC*  
Victor S Chang  
Examiner  
Art Unit 1771

9/19/2005

  
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